United States Environmental Protection Agency | Office of Pollution Prevention and Toxics (TS-779) | EPA744F-93-010 September 1993

# Design for the Environment
## Multiprocess Wet Cleaning Demonstration Study

### Background

In May 1992, EPA, through its Design for the Environment (DfE) program, convened the International Roundtable on Pollution Prevention and Control in the Dry Cleaning Industry. Researchers, industry representatives, and government officials met to exchange information on a number of issues related to the dry cleaning industry, including exposure reduction, regulation, and risk communication. As a result of this roundtable, DfE became aware of an alternative cleaning process called multiprocess wetcleaning. This process relies on the controlled application of heat, steam, and soaps to clean clothes that typically are drycleaned.

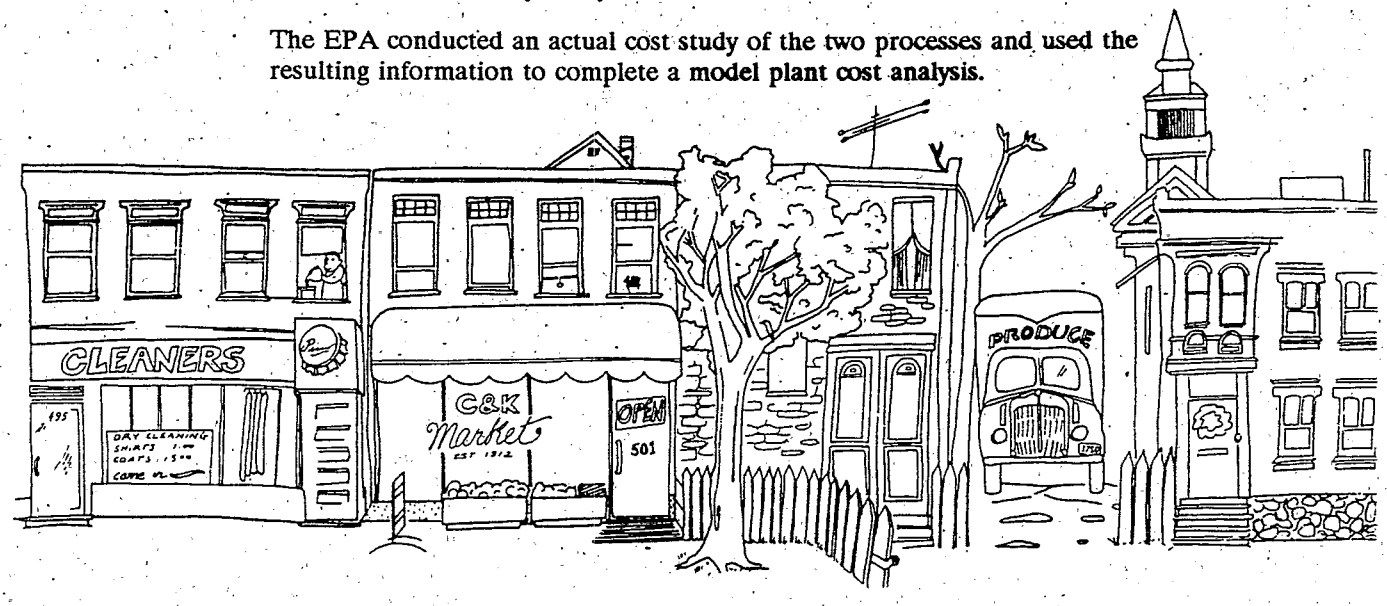
EPA conducted preliminary tests on this process at a Florida dry cleaning plant. For this study, a comparative cost analysis of dry cleaning and wet cleaning techniques was completed. These low volume tests suggested that the multiprocess cleaning method had merit. However, it was determined that a larger, higher volume test for economic feasibility and performance was required.

### How was the Multiprocess Wet Cleaning Study conducted?

For four weeks in November and December of 1992, EPA formed a partnership with members of the clothes cleaning industry to conduct a short term, high volume test to compare the costs and performance of multiprocess wet cleaning and conventional perchloroethylene (PCE) dry cleaning. In this test, over 1500 garments were collected from consumers employed in government agencies in Washington D.C. and New York City and shipped to the New York School of Dry Cleaning in Manhattan. The garments were separated into lots of [illegible] items each; it was randomly determined (by the flip of a coin) which groups would be dry cleaned and which would be cleaned with the multiprocess wet cleaning method. The following studies were performed on the garments:

- Economic Feasibility Study

The EPA conducted an actual cost study of the two processes and used the resulting information to complete a **model plant cost analysis.**



*NY Facility Analysis*

The cleaning comparison was performed at the New York School of Dry Cleaning in Manhattan. A comparison of raw costs unique to each cleaning process was made. All specific costs compared are specific and reflect costs of cleaning in New York City. The study compared the following:

- Capital Costs
- Operating Costs
- Labor Costs

*Model Plant Analysis*

The conditions under which the multiprocess wetcleaning study was performed do not fully represent the situation of a typical operating dry cleaning plant. A theoretical model plant analysis was therefore developed using information from EPA's two previous studies and other sources. Models were developed and analyzed for a variety of mixed mode facilities ranging from a 100% dry cleaning facility to a 100% wet cleaning facility.

- Performance Test

In addition to the economic feasibility study, EPA conducted performance tests comparing the effects of PCE dry cleaning and multiprocess wet cleaning on clothes.

*Test Garments Wear Study*

Thirteen pre-selected garment types were repeatedly worn by volunteers and then cleaned by one of the two techniques. The following tests were conducted:

- Appearance Test
- Odor Test
- Shrinkage Test
- Garment Wear Logs
  Documents the time each participant wore test garment
- Test Garment Postcard Survey
  Documents responses to garment wear survey questions
- Test Garment Visual Tests
  Documents responses to garment appearance

*General Consumer Satisfaction Survey*

- Attached to each garment was an evaluation form to solicit customer satisfaction information

The results of the multiprocess wet cleaning study are currently under review and will be publicly available the week of September 27, 1993.

**For more information, please contact:** EPA's Pollution Prevention Information Clearinghouse (PPIC); U.S. Environmental Protection Agency; 401 M Street, S.W. (PM-211A); Washington, DC 20460; Tel: 202-260-1023; Fax: 202-260-0178